

Claims

- [c1] 1. An implantable medical apparatus comprising an electrical device having a case and a plurality of electrical contacts on said case, a lead having a distal end and a proximal end and carrying a plurality of electrical conductors, and a connector coupled to a proximal end of said lead, said connector having a central bore a plurality of electrical contacts distributed around said bore, each of said contacts being electrically connected to an electrical conductor in said lead and being spatially arranged to contact one of said electrical contacts on said case, and a fastener coupling said connector to said electrical device, said fastener extending through said bore in said connector and having a wide head, said head distributing compressive force over said electrical contacts in said connector.
- [c2] 2. The implantable medical apparatus of claim 1 wherein said wide head extends over substantially all said electrical contacts.
- [c3] 3. The implantable medical apparatus of claim 2 wherein said wide head is a disc.

- [c4] 4. The implantable medical apparatus of claim 3 wherein said fastener comprises a threaded shaft.
- [c5] 5. The implantable medical apparatus of claim 2 wherein said contacts around said bore are radially symmetrical around said bore.
- [c6] 6. The implantable medical apparatus of claim 5 wherein said contacts are arranged in a rectangular pattern around said bore.
- [c7] 7. The implantable medical apparatus of claim 6 wherein said contacts are arranged in a plurality of rectangles.
- [c8] 8. The implantable medical apparatus of claim 7 wherein the rectangles are squares.
- [c9] 9. The implantable medical apparatus of claim 1 wherein said case comprises a first side and a second side substantially parallel to said first side and a wall connecting said first and second sides, said first side having a recess therein, said connector fitting into said recess.
- [c10] 10. An implantable medical apparatus comprising an electrical device having a case and a plurality of electrical contacts on said case, a lead having a distal end and a proximal end and carrying a plurality of electrical conductors,

a connector coupled to a proximal end of said lead, said connector having a central bore a plurality of electrical contacts distributed around said bore, each of said contacts being electrically connected to an electrical conductor in said lead and being spatially arranged to contact one of said electrical contacts on said case, and a fastener coupling said connector to said electrical device, said fastener extending through said bore in said connector, and a plurality of connector seals, each connector seal configured to surround an electrical contact on said case and an electrical contact on said connector when said connectors are in contact with each other.

[c11] 11. The implantable medical apparatus of claim 10 further comprising a gasket circumscribing said electrical contacts.

[c12] 12. The implantable medical apparatus of claim 10 wherein at least some of said electrical contacts are male contacts and each of said seals is mounted around a male contact and a corresponding female electrical contact is sliding received between said male contact and said seal mounted around said male contact.

[c13] 13. The implantable medical apparatus of claim 12 wherein said male contacts are mounted on said case

and said female contacts are mounted on said connector.

[c14] 14. The implantable medical apparatus of claim 13 further comprising a first gasket circumscribing said electrical contacts, said first gasket being mounted on said connector.

[c15] 15. The implantable medical apparatus of claim 14 further comprising a second gasket circumscribing said first gasket.

[c16] 16. The implantable medical apparatus of claim 10 wherein said seals are formed on a flexible sheet, said sheet being mounted under a rigid surface and wherein said seals extend through said surface.

[c17] 17. The implantable medical apparatus of claim 16 wherein said rigid surface is a part of said case and said sheet is inside said case.

[c18] 18. The implantable medical apparatus of claim 17 further comprising at least one gasket circumscribing said electrical contacts and wherein said at least one gasket is mounted on said connector.

[c19] 19. The implantable medical apparatus of claim 18 further comprising a fastener centrally located on said connector and wherein said electrical contacts on said con-

nector are symmetrically arranged around said fastener.

[c20] 20. The implantable medical apparatus of claim 10 further comprising a fastener centrally located on said connector and wherein said electrical contacts on said connector are symmetrically arranged around said fastener.

[c21] 21. An implantable medical apparatus comprising an electrical device having a case and a plurality of electrical contacts on said case,
a lead having a distal end and a proximal end and carrying a plurality of electrical conductors,
a connector coupled to a proximal end of said lead, said connector having a plurality of electrical contacts, each of said contacts being connected to at least one of said electrical conductors and being arranged to connect with at least one of said electrical contacts on said case,
at least some of said electrical contacts comprising pins, and
at least some of said electrical contacts comprising tubes having a proximal end having a slot for receiving an electrical conductor and a distal end having a reduced internal diameter for contacting one of said pins.

[c22] 22. The implantable medical apparatus of claim 21 wherein said distal end of said tubes comprises a plurality of tabs bent inwardly towards a center of said tube.

- [c23] 23. The implantable medical apparatus of claim 21 wherein said distal end comprises at least one diametric slot and a plurality of tabs, each tab having a radially inwardly directed tooth.
- [c24] 24. The implantable medical device of claim 23 wherein said radially inwardly directed tooth has a proximally-facing conical side and a distally-facing conical side.
- [c25] 25. The implantable medical device of claim 24 wherein said tubes have an outer side with a circumferential shoulder thereon.
- [c26] 26. The implantable medical device of claim 21 wherein said tubes have an outer side with a circumferential shoulder thereon.